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small proportion of males that are somatically quite different from males and from intersexes and that are sterile. There is genetical evidence that these males are  $1X : 3$  sets *autosomes* in constitution. Studies of "high non-disjunction" show that triplo-X individuals ordinarily die, but in certain lines they occasionally survive as females that are somatically quite different from diploid or triploid females and that are sterile. Such females occur also in the progeny of triploid females; and, in the case of those produced by non-disjunction, both genetical and cytological proofs of their constitution ( $3X : 2$  sets *autosomes*) are now complete.

CALVIN B. BRIDGES

THE AMERICAN CHEMICAL SOCIETY

(Concluded)

DIVISION OF DYE CHEMISTRY

A. B. Davis, *chairman*

R. Norris Shreve, *secretary*

*Contribution to the estimation of H acid:* H. R. LEE. The stability of diazo-benzene and p-diazo-toluene is taken up from the standpoint of their use as standard volumetric solutions. Data showing the relative stability of these diazo salts both in acid and alkaline solution are presented. Tables showing comparative analyses of a large number of samples of commercial and pure H acids are given. The method used by the Newport Company for the analysis of H acid is outlined. The use of p-diazo-toluene for the analysis of a number of amino-naphthol-sulfonic acids other than H acid is suggested.

*A new alizarin process:* CHAS. W. SCHAFFER. This process depends on a cheap process for manufacture of pyrocatechol and then the synthesis of alizarin according to Baeyer and Caro from pyrocatechol and phthalic anhydride. Phenol is nitrated and reduced wth zinc giving ortho and para amino-phenol. This is diazotized, not filtered and the diazo solution run directly into the still. In the distillation the diazonium chloride, being unstable, is decomposed—water and acid first coming off—and at  $243-245^{\circ}$  C. the pure pyrocatechol comes over. The p-amino-phenol may also be diazotized and sublimed, giving hydroquinone.

*Bleaching of dyed cotton fabrics:* J. MERRITT MATTHEWS. Owing to the demand of the American public for more cotton goods with larger va-

riety of colors it was necessary to modify the old-fashioned method of bleaching in order to properly preserve the color and also to produce a satisfactory bleached fabric. The extension of cotton goods in the field of wearing apparel has been made possible to great degree by the fact that a variety of color effects can now be employed. This has been very beneficial to many of our manufacturing enterprises and has also made it possible to use the cheaper staple cotton in place of the more expensive staples of wool and silk. Furthermore, it has led to the development of apparel materials which can meet the conditions of modern treatment in the laundry. There is an ever increasing demand for faster dyes owing to the fact that modern methods of usage are such as to put a very severe burden on the color. It has been the endeavor of the dyestuff manufacturers to increase continually the line of such fast dyes for the purpose not only of enlarging the color palette, but also of simplifying the method of dyeing so that the dyer is not more inconvenienced by the use of these fast dyes than he would be by using the more fugitive colors.

*The immediate needs of chemistry in America:* WILLIAM J. HALE. The industries are fast ridding themselves of poorly trained chemists and hence the recent period of business depression has come in this respect like a godsend to chemistry in America. A classification of chemists everywhere is attempted. In order that industrial advancement may be made all the more apparent, the highest development of the several classes of chemists is an absolute necessity. Four distinct factors constitute the immediate needs of chemistry in America, the most pertinent being the development of chemists with engineering training. In fact, physics and engineering are no less important than chemistry itself in the training of the young chemist. The greatest need for the future as well as for the present is the collaboration of universities and industries upon researches which take their rise from industrial problems.

*Contribution to the chemistry of malachite green:* JOSEPH R. MINEVITCH. Tetramethyldiamidotriphenyl methane, which is prepared by the condensation of dimethylaniline and benzaldehyde in the presence of hydrochloric acid, when oxidized with lead peroxide as a solution of the dihydrochloride either with or without sufficient acetic acid does not give exclusively the tetramethyldiamidotriphenyl carbinol. The tetracarbinol possesses crystalline properties and forms mala-

chite green crystals either as the oxalate or the zinc double chloride salt. What actually does form in this reaction is a mixture of carbinols, one of which—probably a triphenyl derivative—possesses little or no crystalline properties and forms amorphous salts with oxalic acid or zinc chloride. Hydrochloric acid corresponding to the methane dihydrochloride and in the presence of at least 2.25 molecules of acetic acid gives the maximum of tetramethyl derivative. Oxidation without acetic acid produces a carbinol or a mixture of carbinols which is so weak in crystalline properties as to form little or none of the crystalline malachite green salts.

*Imports of dyes by classes during 1920:* C. R. DE LONG. The following import statistics are presented:

Vat dyes other than indigo.	855,000 lbs.
Mordant and chrome dyes...	840,000 lbs.
Acid dyes .....	765,000 lbs.
Direct dyes .....	595,000 lbs.
Sulfur dyes .....	255,000 lbs.
Basic dyes .....	200,000 lbs.
Indigo .....	171,000 lbs.

*Dyes derived from beta-oxynaphthoic acid and from J-acid with reference to the Chemical Foundation patents:* A. WILLIARD JOYCE. The colors made from beta-oxynaphthoic acid are mostly insoluble in water and oil, and are of special interest to the makers of lake-pigments. Those derived from the arylamides of beta-oxynaphthoic acid are of value as pigments and also as colors developed directly on cotton when used in combination with a diazotized arylamine. This class of colors has been developed chiefly by the German firms of Meister Lucius and Bruning and Griesheim-Elektron. The dyes derived from J-acid are valuable direct cotton colors of good fastness, especially to acids and of great clearness and brilliancy of shade. These colors from J-acid and J-acid derivatives have been greatly developed by leading German dye manufacturers: the Bayer Company, Cassella and Co., Meister Lucius and Bruning, and Kalle and Co. The Chemical Foundation, Inc., owns patents which cover dyes made from the above intermediates.

*The quantitative determination of phenanthrene:* ARTHUR G. WILLIAMS. Phenanthrene in crude phenanthrenes may be quantitatively determined by oxidation in glacial acetic acid solution by iodic acid to phenanthraquinone followed by precipitation of the quinone, also in glacial acetic acid

solution, as toluphenanthrazone by 3,4-tolylene diamine. The hydrocarbon may be conveniently detected qualitatively by oxidation in glacial acetic acid solution by means of  $KBrO_3$  or  $HIO_3$  followed by precipitation by water, filtration, extraction of the residue by  $NaHSO_3$ , liberation of the quinone by means of  $HCl$  and  $FeCl_3$ , extraction with  $CCl_4$ , and final detection of phenanthraquinone by means of the Hilpert and Wolf test with  $SbCl_5$  in  $CCl_4$ .

*Alkali fusions. III. Fusions of phenylglycine o-carboxylic acid with potassium hydroxide and with sodium hydroxide for the production of indigo:* MAX PHILLIPS.

*Vapor pressure determinations on naphthalene, anthracene, phenanthrene, and anthraquinone between their melting and boiling points:* O. A. NELSON and C. E. SENSEMAN.

*Nomenclature of dyestuff intermediates:* J. WARREN KINSMAN.

#### SECTION OF PETROLEUM CHEMISTRY

T. G. Delbridge, *chairman*  
W. A. Gruse, *secretary*

*Petroleum hydrocarbons that can not be distilled:* C. F. MABERY.

*Petroleum: a raw material for our chemical industries:* SIDNEY BORN.

*Some chemical considerations of petroleum refining:* B. T. BROOKS. Chemical investigation has played a relatively unimportant part in the petroleum industry. Reasons advanced for this are: (1) Petroleum has been plentiful and crude methods profitable. (2) Research has been regarded as unprofitable "wild catting." (3) Initiative and spirit of research has been killed by the policy of secrecy. (4) Petroleum technologists are unorganized and inarticulate. (5) Fundamental or theoretical research in this branch of organic chemistry has been comparatively neglected. (6) Chemists have been poorly and narrowly trained. Several factors which are improving this situation are given. It is important to minimize refining losses. Many opinions previously held in regard to olefines are untenable.

*Oil shale:* R. F. BACON.

*Determination of gasoline in natural and casing-head gas:* CHARLES SKEELE PALMER.

*Dechlorination of chlorohydrocarbons:* W. F. FARAGHER and F. H. GARNER.

*Determination of moisture in transformer oils:* C. J. RODMAN.

*Viscosity-temperature curves of fractions of typical American crude oils:* E. W. DEAN and F. W. LANE.

*Iodine numbers of unsaturated hydrocarbons and cracked gasolines:* W. F. FARAGHER, F. H. GARNER and W. A. GRUSE.

*The reclamation of used motor oils:* WILLIAM F. PARISH. The disposal of used motor oils is becoming a serious problem. The chief reason for their poor quality, as recovered from the motor, is the dilution with approximately 30 per cent. of heavy ends from motor fuel. By washing with a water solution of soda ash and distilling off the diluent, airplane motor oils were recovered ten times and more at one aviation camp during the war and gave better service than new oils. The improvement in recovered oils is due to the removal of low boiling constituents.

*Total heats and condensation points of kerosene-air mixtures:* ROBERT E. WILSON and D. P. BARNARD.

*A new method of color measurement for oils:* LEON W. PARSONS and ROBERT E. WILSON.

*Catalytic oxidation of petroleum oils:* C. E. WATERS.

*Viscosities of motor oils at high temperatures:* L. B. LOCKHART. (By title.)

DIVISION OF WATER, SEWERAGE AND SANITATION

W. P. Mason, *chairman*  
W. W. Skinner, *secretary*

*Reactions in the Dorr-Peck tank:* A. M. BUSWELL.

*Definition of alkalinity and temporary hardness:* A. M. BUSWELL.

*Notes on the analysis of mine drainage water:* JOSEPH A. SHAW and N. A. BAILEY.

*Method for the determination of free and combined carbon dioxide:* JOSEPH A. SHAW.

*Radioactivity of miscellaneous waters examined in the Bureau of Chemistry:* W. W. SKINNER and J. W. SALE. Analyses of radioactivity of eleven spring waters collected at source by a representative of the Bureau of Chemistry, of eight river, lake and ocean waters, of fifteen commercial domestic bottled waters, and of twelve imported bottled waters, are tabulated. The significance of the data depends on the fact that no commercial bottled water of natural origin has been found to contain sufficient radioactivity, either temporary or permanent, to warrant its purchase by

consumers because of its content of radioactivity. In order to obtain the minimum daily dose of emanation from the most radioactive sample examined, it would be necessary to consume 2,810 gallons of water daily, and to obtain the minimum daily dose of radioactive salt from the most radioactive sample examined, it would be necessary to consume 2,935 gallons of water daily. To obtain the maximum doses, it would be necessary to consume daily at least ten times these amounts, or 28,100 and 29,350 gallons of water respectively. It is concluded, therefore, that shippers of bottled waters are not justified in making any statements on the labels which will induce prospective consumers to purchase the articles because of their radioactivity.

*A comparison of some miscellaneous samples of ocean, bay and lake waters:* W. W. SKINNER and W. E. SHAEFER. In considering the composition of a water, two things must be borne in mind, (1) the amount of dissolved mineral matter per unit volume which may be termed the concentration of the water, and (2) the character or composition of this dissolved mineral matter. The waters of Chesapeake Bay near Chesapeake Beach, of the Gulf of Mexico off Galveston, Texas, of the Atlantic Ocean off Boston, and of the Pacific Ocean off San Francisco, while varying in concentration, are shown to contain the same constituents in almost exactly the same relative proportions. Therefore, the mineral matter dissolved in the rivers flowing into Chesapeake Bay and the Gulf of Mexico does not materially affect the composition of those waters. Although the concentration of the sea water is greater at rising tide than at falling tide, yet the percentage composition of the dissolved mineral matter in the water remains practically unaffected by the inflow and outflow of the tide. The mineral matter dissolved in certain North Dakota and Utah lakes is somewhat similar in composition to the mineral matter dissolved in Atlantic Ocean water. However, the difference in calcium content between these North Dakota and Utah lakes is noteworthy. The dissolved mineral matter in the three North Dakota lakes contains 4.54 per cent. calcium, while that in the six Utah lakes contains only 0.92 per cent. calcium. These lakes are from one fifteenth to two and three quarters times as concentrated as Atlantic Ocean water.

*The present status of chlorination of public water supply:* S. T. POWELL.

CHARLES L. PARSONS,  
*Secretary*